

and Carboniferous, and on the characters and affinities of the Paleozoic gymnosperms, by Sir WILLIAM DAWSON.

The paper was based upon material recently discovered. Stem, leaves and fruit from the Erian of Pennsylvania serve to establish a new genus and species, *Dictyocordaites Lacoii*, and other unusually perfect material from the same State and from Prince Edward island enable the author to clear up several obscure points in relationship.

The Botanical Club of the A. A. A. S.

It has been the custom of the club from its inception, with possibly an interruption at the Cleveland meeting, to hold its first session on Thursday, the second day of the association. This year did not prove an exception, although both the permanent secretary of the association, in his annual circular, and the secretary of the club, in a special circular, announced the first meeting for Tuesday, the day before the opening of the association. There are good reasons why the opening session should be on Wednesday, but it is doubtful if an earlier date will ever be found practical.

THURSDAY, AUGUST 29.—Shortly after 9 A. M. the president, Dr. T. J. Burrill, called the club to order, the secretary, Dr. Douglas H. Campbell, and a fair number of members being present.

The opening paper was by Mr. Thomas Meehan, who described the arrangement of stamens and pistils in *Hypericum Canadense*, showing that the styles are entangled among the stamens from the first, and claiming this to be an arrangement for self-fertilization. Dr. E. L. Sturtevant spoke of the self-fertilization of the common garden pea, and of the failure of the English bean (*Faba vulgaris*) to produce many pods in American gardens, although flowering freely. Mr. David F. Day had observed that the rose acacia (*Robinia hispida*) bloomed freely about Buffalo, N. Y., but set few pods, and examination had shown little pollen in the anthers. He also stated that the garden variety of *Oenothera biennis* expands its flowers with pollen already deposited on the stigmas. Mr. F. V. Coville said that *Lupinus perennis* also discharges pollen in the bud, but that in this case the stigma is not at the time in a receptive condition. Dr. B. D. Halsted, in his examinations of the garden pea, had found no germinating pollen

before the flower had opened. He had experimented with barberry by covering the flowers before opening, and had obtained fruit in only about three cases in a hundred, and possibly then only through defective protection. The pollen was there, but needed insects to elevate it to the stigmas. Dr. T. J. Burrill suggested similar tests with *Hypericum*. Dr. W. J. Beal thought it important to note the effect upon the stock of early and late fertilization.

Mr. Meehan also read a paper on the cleistogamy of *Cerastium nutans*. All specimens in the Philadelphia herbarium, wherever from, appeared to be cleistogamous, as well as the plants growing about the city. Similar observations had been made by Judge Day at Buffalo, and Mr. C. F. Wheeler in Michigan. Dr. N. L. Britton spoke of the frequency of apetaly in the Caryophyllaceæ, but thought cleistogamy almost unknown. Mr. Coville had noticed that *Draba verna* was cleistogamous during winter in the south.

Dr. B. D. Halsted read a paper on the pollen of *Pontederia cordata*, which is printed in full on another page.

Dr. Halsted also described the explosiveness of the pods of the wild bean, *Phaseolus diversifolius*, explaining the mechanism by which it is brought about. Dr. Britton said that many other species of the genus, and especially the tropical ones, expel the seeds in the same manner. He also called attention to the fact that this plant is really *P. helvolus* of Linnæus, the two names being interchanged in the manuals. Mr. M. B. Waite described the projection of seeds from the pods of native violets.

Dr. Britton showed herbarium specimens of quite a number of additions to the North American flora, and made interesting remarks in relation to them.

A collection of fifty-four well prepared cultures of bacteria and moulds on agar-agar, made by Dr. Roswell Park, of Buffalo, was exhibited to the club.

FRIDAY, AUGUST 30.—Mr. Coville read a report from the Botanical Division of the U. S. Department of Agriculture, which was referred to a committee, consisting of Messrs. Burrill, Day and Macoun. Remarks complimentary to the department were made by Drs. Burrill, Britton and others. Mr. Macoun spoke of the botanical work being done by the Canadian survey, of the fraternal feeling of Canadian botanists for those of the United States, and of their willingness to supply material to any American scientists who may be working up special orders or groups.

Dr. Britton read a paper on the occurrence of a Siberian Labiate in Canada, and exhibited dried specimens of it. The plant is *Elsholtzia cristata* Willd., and was collected by Dr. John J. Northrop on the shore of Lake Notre Dame, province of Quebec, in 1887 and 1889. It appears like an indigenous plant in its habit of growth and persistence, but is supposed to have been introduced in wheat.

Dr. Britton also spoke of the trip of Dr. Morong in South America and its expected results in adding greatly to our knowledge of the little known flora of Paraguay. Drs. Burrill and Campbell were appointed a committee to draft a resolution expressing the interest of the club in Dr. Morong's labors.

Dr. W. J. Beal gave a description of the fruiting of *Mesocarpus* (*Pleurocarpus*) from collections made at Lansing, Mich., showing both lateral and scalariform conjugation on the same plants. As this is the principal character separating the two genera, the observation appears to remove all doubt that the latter genus should be merged in the former, a change that has already been suggested. The discussion was chiefly on the significance of conjugation in general. Dr. Burrill spoke especially of the so-called conjugation of the secondary spores of *Tilletia*. Dr. Bessey thought this might be an obsolescent sexual act on an obsolescent mycelium. Dr. Campbell said the essential part of the sexual act is the copulation of the nuclei, already demonstrated in some *Zygnemaceæ* and other lower orders, and abundantly in the higher ones.

Dr. Douglas H. Campbell called attention to the chlorophyll in the embryo of *Celastrus scandens*, exhibiting specimens, as illustrating the formation of chlorophyll in comparative darkness. Dr. Britton alluded to the similar case of chlorophyll in the pith of *Phoradendron*. He also said that he had seen a Lima bean plant grown by a workman on one of the lower levels of the Dickinson iron mine in New Jersey which had reached full eight feet in height and had an abundance of chlorophyll, although its only light came from candles.

Dr. Campbell then described his methods of obtaining and staining the pollen mother-cells of *Podophyllum* and *Allium* to show nuclear division. He also spoke of the ease with which he had grown aquatic plants in the laboratory for class use by using large glass jars and only occasionally changing the water. This evoked quite an animated discus-

sion, the experience of the members of the club being quite diversified, there having been more failures apparently than successes.

Dr. J. C. Arthur described the arrangement of curtains in his laboratory, by which he considered that he had secured a better and more efficient lighting with a south exposure than is possible when the light is admitted from any other direction.

MONDAY, September 2.—As many as half the members of the club were absent on the excursion to the Muskoka lakes, but the usual meeting was held at 9 A. M. in the biological room, Prof. Bessey acting as president and Prof. Arthur as secretary *pro tem*.

The treasurer's report was read, showing a deficit of over four dollars. After some discussion it was laid on the table for subsequent action.

Mrs. Henrietta L. T. Wolcott desired to learn if the amber-colored choke-cherry occurred in Canada, as she had been told that it did. She reported the destruction, during some street improvements, of the original trees with amber-colored fruit in Dedham, Mass., which the club had heard about at former meetings, and which Dr. Sereno Watson had thought worthy of being described as a distinct variety. No one was able to give the information desired, but it was the opinion, especially of Mr. Macoun, that no such variety was known to exist in Canada.

Mr. W. H. Seaman exhibited a number of species of interesting plants gathered in the vicinity of Toronto, and also a convenient portable plant press. Quite an extended discussion arose on different forms of presses and methods of collecting. Mr. Macoun said that he and his son together had collected as many as 20,000 specimens in a season in connection with the Canadian survey. They use presses with board sides and stout straps, containing about twenty sheets of the usual drying papers. To secure good specimens in wet weather, when in camp, the dryers are held before the camp fire one by one until a pile of hot dryers is secured to which the plants are transferred from the hand press. Other papers are similarly heated, and the plants again transferred. Usually three transfers are enough to fully dry all but the thickest specimens, so that the plants collected in the forenoon may be dried during the afternoon.

The members who participated in the excursion to the lakes met at the usual hour of 9 A. M. in the upper cabin of

the steamer Nipissing on Lake Rosseau, and were called to order by the president, Dr. Burrill. In the absence of the secretary, that office was temporarily bestowed on Mr. Henry Farquhar.

Mr. Meehan reported observations on the development of the inflorescence of *Corydalis sempervirens*, in which the middle flowers appear first, then those above and below alternately. The discussion showed that similar behavior had been observed in other members of the same order and in the Dipsacæ.

The vegetation of the Muskoka lakes was discussed at considerable length, specimens exhibited and several puzzling forms described. On motion of Mr. Day, Dr. Britton was appointed to prepare and publish in the *Bulletin of the Torrey Club* as complete an account as possible of the flora of the lakes.

TUESDAY, September 3.—The usual meeting was held at 9 o'clock with Dr. Burrill in the chair, and with Dr. Arthur still acting as secretary *pro tem*.

A committee on the nomination of officers for the ensuing year was appointed to consist of Messrs Day, Bessey and Coville.

The treasurer's report was then taken from the table and after some discussion was accepted. Voluntary subscriptions were then offered, amounting to \$11.50, which not only canceled the indebtedness of the society, but left enough in the treasury to meet the preliminary expenses for the coming year.

The desirability of having a permanent record of the proceedings of the club in a convenient form was discussed, and it was the general opinion that such should be entered in the volume that had been procured for the purpose in compliance with the action of the club at the Cleveland meeting. The accounts as published in the *Bulletin of the Torrey Club* and the GAZETTE could be used as the basis for the previous years.

The committee appointed Friday to consider the report from the Botanical Division of the Department of Agriculture offered the following, which was heartily adopted by the club:

Having been informed of the active and encouraging work of the Botanical Division of the United States Department of Agriculture, we take great pleasure in expressing our high appreciation of the important work already accomplished and in the extensive undertakings in progress. The recognition by Congress of the importance of this botanical work, manifested by liberal appropriations of money, make possible, for

the first time in America, adequate scientific and practical researches upon native and introduced plants—in health and disease—upon which the wealth of the country so largely depends, and in which is centered the highest educational and æsthetical interests.

We heartily commend the management of this botanical division and section of vegetable pathology by those now in charge, and cheerfully express our readiness to aid them in any and every possible way.

T. J. BURRILL,
DAVID F. DAY,
Committee.

A paper was read by Prof. Joseph F. James on the value of color as a character in classification. He gave examples of its employment in such cases as *Impatiens pallida* and *fulva*, *Melilotus officinalis* and *alba*, *Datura Stramonium* and *Tatula*, *Morus rubra* and *alba*. Odor is also sometimes an important character. Dr. Britton made confirmatory remarks.

The officers for the coming year were then elected in accordance with the report of the nominating committee, as follows: President, Dr. N. L. Britton, of Columbia College; Vice-President, Prof. F. L. Scribner, of University of Tennessee; Secretary and Treasurer, Dr. Charles R. Barnes, of University of Wisconsin.

Mr. W. M. Beauchamp reported an acknowledgment from Mrs. Gray in reply to the resolutions passed by the club at the Cleveland meeting on the death of Dr. Gray.

Mr. Coville made a report on the present condition of the Botanical Exchange Club. There are twenty members. Of the forty dollars received as membership fees, there remains, after paying for printing, postage and other necessary expenses, a balance of \$14.76. A considerable saving might be effected if the privilege of using the government frank could be secured in forwarding the return packages. 3,260 specimens have been received from members and 1,295 sent in return, leaving more than half still on hand. Printed copies of the rules were distributed.

The following committee report was then read and most heartily adopted:

Your committee appointed to make some expression of the interest taken by members of this club in the South American collecting trip of Dr. Thomas Morong beg leave to report as follows:

Resolved, That the compliments of the A. A. A. S. Botanical Club be sent to Dr. Thomas Morong, now making botanical collections in unexplored regions of South America, and that we tender to him an expression of our warmest interest in, and heartiest appreciation of, his arduous but highly promising labors in the new fields of his choice. We sincerely hope he may in due time return with health and strength, burdened only

by abundant success and large contributions to the known flora of the world.

T. J. BURRILL,
DOUGLAS H. CAMPBELL,
Committee.

A committee, consisting of Messrs. Britton, Seaman and James, was appointed to draft resolutions in recognition of the courtesies received from the local committee.

The hour for the sectional meeting having now arrived, the club adjourned until the close of the morning session of the biological section.

The adjourned session was necessarily short, and time was taken only to hear the following resolutions :

WHEREAS, The Botanical Club of the American Association for the Advancement of Science having been most cordially and generously entertained by the citizens of Toronto; and

WHEREAS, The excursions tendered by the local committee of Toronto to the members of the association have been especially enjoyed by the botanical members thereof, who have been thereby enabled to visit points of botanical interest; therefore, be it

Resolved, That the Botanical Club extend their hearty thanks to the local committee for the arrangements made for their comfort and pleasure during the meeting for 1889.

WM. H. SEAMAN,
N. L. BRITTON,
JOS. F. JAMES,
Committee.

Resolved, That the Botanical Club of the A. A. A. S. notes with great pleasure the liberality shown by the Canadian government in providing the admirable new building and equipment for the Biological Department of the University of Toronto, and ventures to hope that at an early day the facilities here provided may be extended to include a suitable botanic garden, to which end the members of the Botanical Club pledge such assistance as may lie in their power.

Both resolutions were warmly adopted, and the club adjourned.

The sessions of the club proved much too short to hear all the papers and discuss the subjects which the members desired to bring before it, and several valuable papers were not reached.

EDITORIAL.

It was a prominent motive with the founders of the Botanical Club to make it an instrument in expanding and elevating the botanical thought of the American Association for the Advancement of Science as expressed in the papers presented before it and in the selection of botanical enterprises which it desires to foster. It was believed that if this could be accomplished to any extent, the influence would be felt in rais-